PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PD53615PC00	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. PCT/EP2005/001582	International filing date *(day/month/year)* 17.02.2005	Priority date *(day/month/year)* 22.03.2004
International Patent Classification (IPC) or national classification and IPC INV. H01Q9/04 H01Q1/24		
Applicant SONY ERICSSON MOBILE COMMUNICATIONS AB et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *sent to the applicant and to the International Bureau)* a total of 1 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☒	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
13.10.2005	30.06.2006
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Kruck, P Telephone No. +49 89 2399-7129

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2005/001582

Box No. I Basis of the report

1. With regard to the **language**, this report is based on

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of:
   - ☐ international search (under Rules 12.3(a) and 23.1(b))
   - ☐ publication of the international application (under Rule 12.4(a))
   - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-7 as originally filed

Claims, Numbers

1-8 received on 15.10.2005 with letter of 13.10.2005

Drawings, Sheets

1/1 as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2005/001582

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-8
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-8
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-8
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D1: US 2003/068987 A1 (HERVE PASCAL ET AL) 10 April 2003 (2003-04-10)
D2: FR-A-2 837 036 (SAGEM) 12 September 2003 (2003-09-12)
D3: US 2002/187758 A1 (YLITALO JUHA ET AL) 12 December 2002 (2002-12-12)
D4: WO 02/35810 A (SIEMENS AG ;NEVERMANN PETER (US)) 2 May 2002 (2002-05-02)
D5: US-B1-6 259 418 (JONES JEFFREY L ET AL) 10 July 2001 (2001-07-10)

Reference is made to the clarity objections raised under Item VIII.
The mentioned lack of clarity notwithstanding, the following is to be noted:

Document D1 is regarded as being the closest prior art to the subject-matter of claim 1 and shows (the references in parentheses applying to this document):

- a portable communication device (Fig. 5, 10) comprising a board for receiving electrical circuits (Fig. 5, 10, 100) and comprising a ground plane (Fig. 4, 41) and having at least one throughhole (paragraph 36, lines 1-2),
- an antenna element provided on one side of the board (Fig. 4, 40), and
- an acoustic element placed on the board aligned with the throughhole (Fig. 4, 30),

The subject-matter of claim 1 differs from the portable communication device known from D1 in that a mesh made of an electrically conducting material is placed between a cover of said acoustic element and said board and wherein said mesh is connected to said ground plane.

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as to find an alternative solution for complementing the ground plane of the antenna element in order to avoid the deterioration of the antenna efficiency in the presence of throughholes in the

antenna ground plane.

D1 solves the above problem in that an electrically conductive cover of said acoustic element is connected to the ground plane.

However, none of the prior art documents on file discloses or hints the use of a mesh of an electrically conducting material placed between a cover of the acoustic element and the board underneath the antenna element.

The solution to this problem proposed in claim 1 of the present application is therefore considered as involving an inventive step (Article 33(3) PCT).

Claims 2-8 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

Re Item VIII

The application does not meet the requirements of Article 6 PCT, because claim 1 is not clear. According to the description and the figures the invention solves the problem of maintaining the antenna efficiency when an acoustic element is placed in a throughhole in the ground plane underneath the antenna element (description page 1, lines 21-25, lines 33-36; page 5, lines 20-26; figures 2 and 3).

However, claim 1 does not contain any features which define the relation and arrangement between the throughhole and the acoustic element on the one side and the antenna element on the other hand. These features are essential to the definition of the invention.

Since independent claim 1 does not contain such features it does not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

CLAIMS

1. Portable communication device (10) comprising:
a board (12) for receiving electrical circuits and comprising a ground plane (20) and having at least one throughhole (22),
an antenna element (14) provided on one side of the board, and
an acoustic element (16, 24, 26, 28) placed on the board aligned with the throughhole,
wherein a mesh (34) made of an electrically conducting material is placed between a cover (28) of the acoustic element and the board (12) and being connected (30, 32) to the ground plane of said board for enhancing the efficiency of the antenna.

2. Portable communication device according to claim 1, wherein the antenna element is positioned with at least one part at a distance above the board, for defining an antenna volume between the board and the antenna element, and said at least one hole is provided under the antenna element.

3. Portable communication device according to claim 2, wherein the acoustic element is provided on another opposite side of the board.

4. Portable communication device according to claim 3, wherein an acoustic box (18) associated with the acoustic element is provided in the antenna volume.

5. Portable communication device according to any previous claim, wherein the mesh is connected to the ground plane using electrically conducting springs.

6. Portable communication device according to any of claims 1 - 4, wherein the mesh is connected to the ground plane using an electrically conducting gasket.

7. Portable communication device according to any previous claim, wherein the antenna element is a PIFA antenna element.

8. Portable communication device according to any previous claim, wherein it is a cellular phone.